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PETROGRAPHY.¹

Contact Effects around Saxon Granites.—The effects of the granite and syenite of Lausitz, of the granitite of Markersbach and of the tourmaline granite of Gottleube upon the rocks through which they cut in the Elbthalebirge in Saxony, are concisely described by Beck.² The members of the phyllite formation and the beds of Cambrian, Silurian and Devonian age, whatever may have been their nature, have all undergone contact metamorphosen near their junction with the eruptives. During the process of alteration there seems to have been little addition of material to the metamorphosed rocks, as all the contact products when originating from the same member of the bedded series are the same, irrespective of the nature of the metamorphising eruptive. The great variety in the contact products of the region is due solely to differences in the character of the originals of the altered rocks. The phyllites have been changed to 'Fruchtschiefer' and into andalusite mica schists, chlorite gneisses into biotite gneiss, and feldspathic quartzites into hornfels. The Silurian slates near the contacts have become hornstones and knotty schists, carbonaceous quartz schists have changed into graphitic quartzites, graywackes and marbles have been made crystalline, and the latter rock has in many cases been changed into a calc-silicate aggregate, which has been impregnated with ore masses, presumably originally in the granitite with which the limestones were in contact. Diabases and diabase tuffs in proximity to the intrusive rocks have been amphibolized. The Devonian rocks have suffered the same alterations as the corresponding Silurian ones, and in addition there has been formed a gneiss-like rock whose predecessor among the clastics is unknown. A large number of contact minerals are discussed at length by the author, chief among them being quartz, plagioclase, cordierite and graphite. The article is full of instructive suggestions though nothing of striking novelty is met with in it.

The Schists of the Malvern Hills.—Callaway³ has published a final summary of the conclusions based on seven years work in the Malvern Hills. He reiterates his belief that the schists of the region

¹Edited by Dr. W. S. Bayley, Colby University, Waterville, Me.

²Min. u. Petrog. Mitth. XIII, p. 290.

³Quart. Jour. Geol. Soc., XLIX, p. 398.

are squeezed eruptives, and discusses the physical, mineralogical and chemical changes that have effected the alteration of the granites and diorites into gneisses and schists of various kinds. His conclusion that a sericite schist may be derived from diorite and that biotite is often an alteration product of chlorite are both of great interest. In the change of a massive into a schistose rock, the author states that the former "passes through the intermediate state of a laminated grit, which thus simulates a true sediment, the subsequent stages of alteration and cementation resembling the process of metamorphism in some bedded rocks." In the production of the foliation there is decomposition of the original components of the massive rock and a reconstruction of new minerals largely from these decomposition products. In the Malvern Hill rocks orthoclase has been replaced by quartz and muscovite, plagioclase by quartz and muscovite, chlorite by biotite and white mica, and biotite by a white mica. A number of analyses appear in the paper to illustrate the chemical changes that have accompanied the physical ones through which the respective rocks have passed.

A Soda-Rhyolite from the Berkeley Hills, Cal.—In the Contra Costa Hills near Berkeley, California, are occurrences of a volcanic flow that has been investigated by Palache,⁴ who recognizes three facies of the rock. In the first, the porphyritic phase, phenocrysts of quartz and feldspar are abundantly disseminated through a micro-grauular aggregate of the same minerals. The second phase is characterized by the possession of numerous small spherulites in a glassy matrix, in which are a few small grains of magnetite and some feathery aggregates of chalcedony. The third phase is a glass containing tiny microlites of feldspar and grains of magnetite: Analyses of the different types indicate that the material of each type has the composition of a soda-rhyolite. The spherulitic variety which is intermediate between the other two, in its acidity is composed as follows:

SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	CaO	MgO	K ₂ O	Na ₂ O	H ₂ O	Total	Density
75.46	13.18	.91	.95	.10	1.09	6.88	.93	= 99.50	2.42

Diabases from Rio Janeiro, Brazil.—Sections from a series of twelve diabase dykes from Rio Janeiro, Brazil, have been investigated by Hovey,⁵ with some interesting results. The chemical composition

⁴Bull. Dept. Geol. Univ. Cal., Vol. 1, p. 61.

⁵Min. u. Petrog, Mitth. XIII, p. 211.

of all the dykes is practically the same. Their mineral composition and structure, however, vary. In the largest dykes the number of constituents discovered is much greater than in the smaller ones. They embrace the usual diabase components with the addition of a light colored sahlitic pyroxene differing from the sahlite of Sala in the value of its optical angle. In the Brazil mineral $E_a=32^\circ 39'$, while in the Sala mineral it is $112^\circ 30'$. It is the oldest constituent of the rock after magnetite, and, consequently it is that which approaches most nearly to being idiomorphic. The structure of the large dykes is gabbroitic and ophitic, whereas that of the small ones is porphyritic and hyalopilitic, with the pyroxene figuring as the phenocrysts. Quartz is not uncommon in the coarser rocks and granophyric intergrowths of quartz and feldspar are frequently met with.

The New Island off Pantelleria—A Correction.—In these notes for December⁶ last, the statement was made concerning the material of a recent eruption near Pantelleria, that it consisted of loose blocks and of lava. Mr. G. W. Butler of Chertsey, England, corrects this statement in a recent letter to the writer and declares that the new island formed during the eruption was composed entirely of loose scoriaceous bombs, which disappeared a short time after the eruption ceased.⁷

Petrographical Provinces.—Iddings⁸ gives a brief and, consequently, a tantalizing account of the old volcano of Crandall Basin in the Absaranka Range of Mountains in the Yellowstone National Park, that has been eroded in a manner to give a good section of the cone with the dykes and flows radiating from it. The different rock types mentioned in the paper are simply alluded to, a full account of them being promised later. The author's conclusion from his study is to the effect that we have here proof that the texture of rocks and their mineral composition is more directly dependent upon the rapidity with which the rocks cooled, than upon the pressure to which they were subjected during their solidification. The differentiation of rock magmas is also well shown in the case of the volcano studied by the production of many individual rock types.

Upon comparing thirty-nine of the best analyses of rocks occurring in the eruptive areas around the Bay of Naples, Lang⁹ concludes that

⁶AMERICAN NATURALIST, Dec., 1893, p. 1088.

⁷Cf. also G. W. Butler; *Nature*, April 21, 1892.

⁸Jour. Geol., Vol. 1, p. 606.

⁹Zeits. d. deutsch. geol. Ges. XLV, p. 177.

there are here three independent volcanic centers, represented respectively by Ischia, Vesuvius and Mt. Nuovo. That they are on different volcanic fissures is indicated by the differences in the character of the lavas extruded from them, especially in their sodium and calcium contents. At each center each magma became differentiated, and this differentiation explains the variety of the rock types discovered in each.

'A study in the consanguinity of eruptive rocks' is the title of an article by Derby¹⁰ in which is shown the fact that the occurrence of the eleolite syenites, phonolites, monchiquites and other related rocks in Brazil, point to the correctness of the notions of differentiation and consanguinity as explanatory of the existence of different phases of eruptive rocks within the same volcanic sphere. The author also shows that, while not having formulated the theory, its principle has been the guide in his work on the Brazilian rocks.

Miscellaneous.—Upon examining spherulites of lithium phosphate between crossed nicols, McMahon¹¹ finds that some of the groupings present apparently miaxial crosses which remain fixed in position during a complete revolution, while in others the cross breaks up into two hyperbolic branches resembling those of biaxial optical figures. The phenomenon, the author regards as due to molecular strains that affected the spherulites at the time of their crystallization.

¹⁰Jour. Geol., Vol. 1, p. 579.

¹¹Mineralogical Magazine, X, p. 229.